HIGH-RESOLUTION INFRARED SPECTROSCOPY AND ANALYSIS OF THE ν_2/ν_4 BENDING DYAD AND ν_3 STRETCHING FUNDAMENTAL OF RUTHENIUM TETROXIDE

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RuO_4 is a heavy tetrahedral molecule which has practical uses for several industrial fields. Due to its chemical toxicity and the radiological impact of its 103 and 106 isotopologues, the possible remote sensing of this compound in the atmosphere has renewed interest in its spectroscopic properties. We investigate here for the first time at high resolution the bending dyad region in the far IR and the line intensities in the ν_3 stretching region. Firstly, new high resolution FTIR spectra of the bending modes region in the far infrared have been recorded at room temperature, using a specially constructed cell and an isotopically pure sample of $^{102}RuO_4$. New assignments and effective Hamiltonian parameter fits for this main isotopologue have been performed, treating the whole ν_2/ν_4 bending mode dyad. We provide precise effective Hamiltonian parameters, including band centers and Coriolis interaction parameters. Secondly, we investigate the line intensities for the strongly infrared active stretching mode ν_3, in the mid infrared window near 10 μm. New high resolution FTIR spectra have also been recorded at room temperature, using the same cell and sample. Using assignments and effective Hamiltonian parameter for $^{102}RuO_4$, line intensities have been retrieved and the dipole moment parameters fitted for the ν_3 fundamental. A frequency and intensity line list is proposed.